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None

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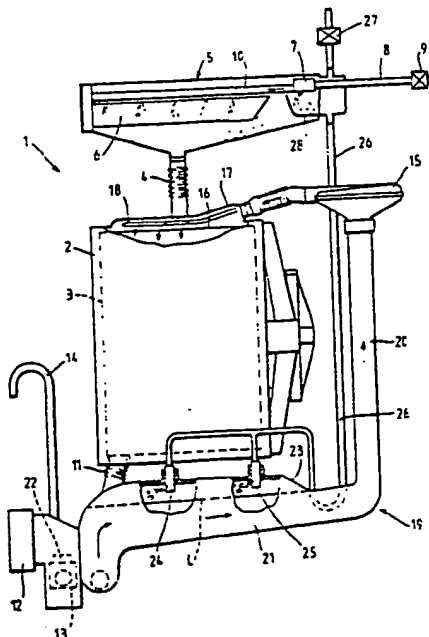
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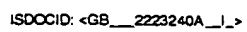
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(54) Washer/drier

(57) A machine for washing and drying laundry, comprising a tub 2 accommodating a drum 3 for the laundry which is rotatable about a horizontal axis and connected in its upper part to the water supply system by way of a distributor 5 for detergents and additives and in its lower part to a discharge conduit 11 and a discharge pump 12, a pneumatic drying circuit provided with a fan 15 which displaces dry heated air into contact with the laundry by way of a conduit provided with heating elements and which draws in cold moist air through the discharge conduit 21/20 of the tub and through a condensation arrangement cooled by at least one spray nozzle 24, 25 which can be supplied with the water from the water system and which is connected to said discharge pump 12. The condensation arrangement comprises an air trap 23 to which there is connected at least one siphon conduit 26 connecting the spray nozzle to the water supply. A collector 28 is disposed below the water supply zone of the detergent distributor 5 and connected to the siphon conduit, said collector 28 collecting the excess supply water of the distributor and passing it to the siphon conduit 26.



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COMBINED MACHINE FOR WASHING AND DRYING LAUNDRY

The invention concerns a combined machine for washing and drying laundry, in particular a washer-drier of domestic type provided with a water-cooled condensation arrangement capable of improving the level of efficiency of the machine during the laundry drying phase.

Italian patent application number 45705/A/88 to the present applicants discloses a condensation arrangement for washer-drier machines having a spray nozzle connected to the water supply of the machine by means of a siphon conduit bent in the form of a double 'U' and an air trap.

The siphon conduit and the air trap prevent the washing lye present in the condenser during the washing phase from also penetrating into the spray nozzle, which could otherwise give rise to incrustation and clogging phenomena which could quickly result in malfunctioning of the condensation arrangement.

That design configuration is however inadequate during the subsequent laundry rinsing phases or when the condenser is subject to partial emptying and filling with washing lye, during the phases of discharge of the tub, accompanied by spinning of the laundry, or when it is affected by the formation of substantial amounts of foam. According to the present invention, there is provided a combined machine for washing and drying laundry, comprising a tub accommodating a drum for the laundry, which drum is rotatable about a horizontal axis and connected in its upper part to the water supply system by way of a distributor for detergents and additives and in its lower part to a discharge conduit and a discharge pump, a pneumatic drying circuit provided with a fan which, in use, displaces dry heated air into contact with the laundry by way of a conduit provided with heating means and which draws in cold moist air through the discharge conduit of the tub and through a

condensation arrangement cooled by at least one spray nozzle which can be supplied with the water from the water system and which is connected to said discharge pump, said condensation arrangement comprising at least one air trap to
5 which there is connected at least one siphon conduit connecting the spray nozzle to the water supply, and in which a collector is disposed below the water supply zone of the detergent distributor and connected to the siphon conduit, said collector being capable of collecting the
10 excess supply water of the distributor and passing it towards the siphon conduit and the condensation nozzle or nozzles.

As will become apparent from the following description, the invention can achieve cleanliness of the
15 condensation nozzle even during the laundry rinsing phases.

The features and advantages of the invention will be more clearly apparent from the following description which is given by way of non-limitative example and with reference to the accompanying single figure which is a
20 diagrammatic view in longitudinal section through a combined washing and drying machine according to the invention.

The washer-drier machine 1 according to the invention comprises a tub 2 in which a drum 3 for the laundry to be washed and dried is disposed, being rotatable
25 about a horizontal axis. The drum 3 is driven in rotation by means of an electric motor and known transmission means (not shown).

The top side of the tub 2 is connected by way of a flexible conduit 4 to a conventional distributor 5 for
30 detergents and additives in powder and liquid form for carrying out the operating programmes of the machine 1.

The detergent distributor 5 essentially comprises a conventional removable drawer 6 in which are disposed the various compartments for containing the detergents and
35 additives in liquid and powder form, a rotating nozzle 7

connected to the water system by way of a conduit 8 and an electrically operated valve 9, and finally a conveyor device 10 which is disposed in the part above the drawer 6 and which is capable of introducing the water from the nozzle 7 into the compartments in the drawer 6. The lower side of the tub 2 is connected by means of a flexible conduit 11 to a discharge unit comprising a filter element 12, a discharge pump 13 and a discharge conduit 14.

The drying air circuit comprises a fan 15, a conduit 17 provided with heating elements 18 and a condensation arrangement 19 which are respectively operable to circulate, heat and dehumidify the drying air.

The delivery side of the fan 15 is connected by means of the conduit 17 to an aperture 16 in the top of the tub 2. The intake side of the fan 15 is directly connected to the condensation arrangement 19 of the water-cooled type.

As described in the present applicant's above mentioned Italian patent application number 45705A/88 the condensation arrangement 19 comprises two portions 20 and 21 which respectively extend in a vertical direction and in a horizontal, slightly downward inclined direction. The downwardly inclined horizontal portion 21 occupies a position beneath the level to which the tub 2 is loaded with water when the laundry washing cycles are being carried out.

The inclined portion 21 is connected both to the interior of the tub 2 by way of the flexible conduit 11 and to the intake connection 22 of the discharge pump 13.

Finally the condensation arrangement 19 comprises an air trap 23 which projects upwardly from the inclined portion 21 and two spray nozzles 24 and 24 which are connected to the water supply by means of a conduit 26 which is bent in a siphon configuration and an electrically operated valve 27 or the like.

During the washing operation, introduced into the siphon conduit 26 is an amount of water sufficient to

counterbalance the pressure that the free surface L of the washing lye which passes into the condenser 19 applies to the air which is confined in the air trap 23. Consequently during the washing cycles the air trap 23 preserves the
5 spray nozzles 24 and 25 from any contact with the lye present in the condenser 19.

It should be noted that during the laundry rinsing cycles the rotating nozzle 7 of the detergent distributor 5 passes an amount of water greater than that which can be
10 effectively removed from the compartments containing the additives for the rinsing phase (for example the softening additive).

Normally the excess water escapes from the distributors 5 and is passed to the interior of the tub 2 by
15 way of the flexible conduit 4.

In the machine 1 according to the invention the water which is rejected from the distributor 5 is advantageously collected by a collector 28 beneath the distribution nozzle 7. The collector 28 is connected to the
20 siphon conduit 26 and thus to the condensation nozzles 24 and 25.

Consequently the column of water collected by the collector 28 moves downwardly under the force of gravity along the siphon conduit 26 and issues from the condensation
25 nozzles 24 and 25, keeping them clean even during the phases for discharge of the lye with spin and during the successive laundry rinsing phases.

By virtue of this simple design configuration, the machine guarantees the efficiency of the condensation
30 nozzles 24 and 25 during the drying phase, avoiding complicating the machine programmer device with the additional function of opening the electrically operated valve 27 for also supplying the condensation nozzles 24 and 25 during the laundry rinsing phase.

CLAIMS

1. A combined machine for washing and drying laundry, comprising a tub accommodating a drum for the laundry, which
5 drum is rotatable about a horizontal axis and connected in its upper part to the water supply system by way of a distributor for detergents and additives and in its lower part to a discharge conduit and a discharge pump, a pneumatic drying circuit provided with a fan which, in use,
10 displaces dry heated air into contact with the laundry by way of a conduit provided with heating means and which draws in cold moist air through the discharge conduit of the tub and through a condensation arrangement cooled by at least one spray nozzle which can be supplied with the water from
15 the water system and which is connected to said discharge pump, said condensation arrangement comprising at least one air trap to which there is connected at least one siphon conduit connecting the spray nozzle to the water supply, and in which a collector is disposed below the water supply zone
20 of the detergent distributor and connected to the siphon conduit, said collector being capable of collecting the excess supply water of the distributor and passing it towards the siphon conduit and the condensation nozzle or nozzles.

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2. A combined machine for washing and drying laundry constructed and arranged to operate substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.